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Floodplain Restoration on the UMR



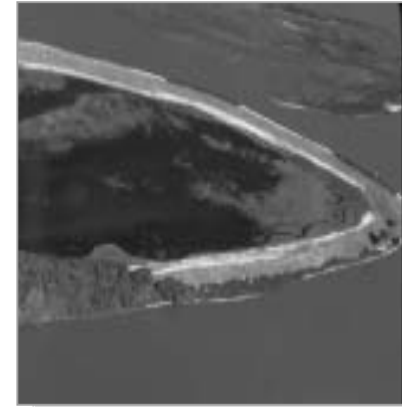
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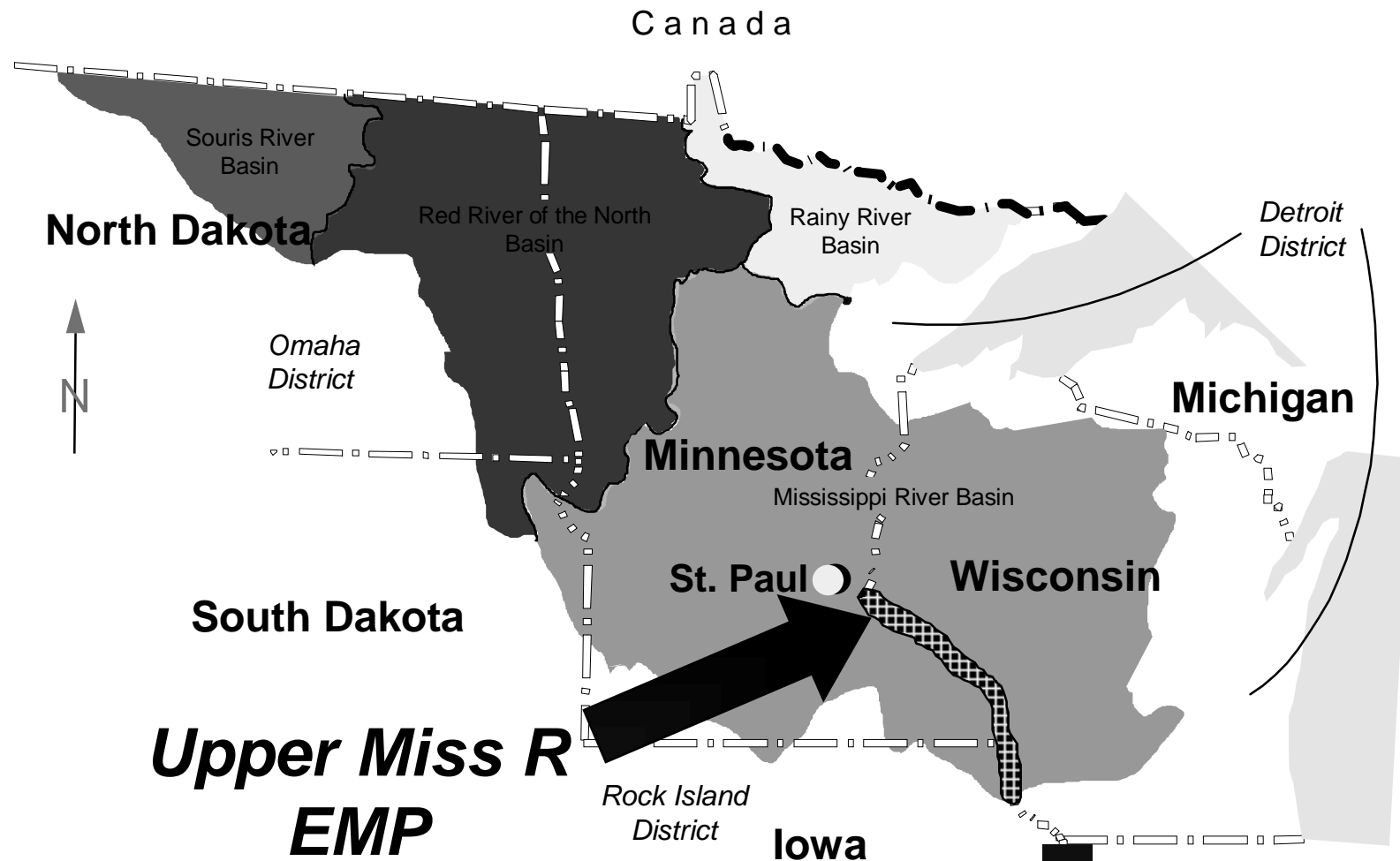
The UMRS Environmental Management Program





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UPPER MISSISSIPPI RIVER ENVIRONMENTAL MANAGEMENT PROGRAM





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In the beginning . . .



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Backwaters



**Lock and Dam No.
10
Guttenberg, Iowa**



Pool 9



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Sedimentation

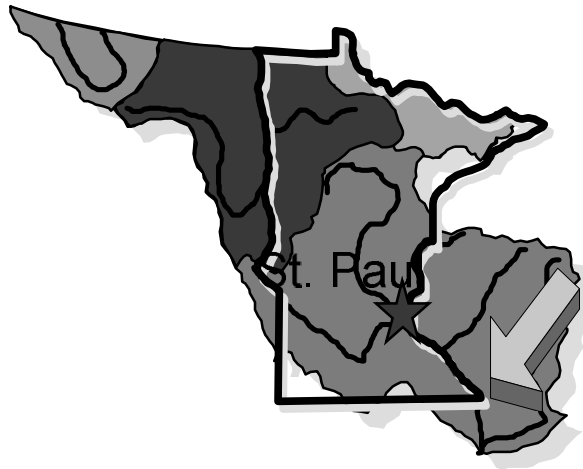


Pool 8



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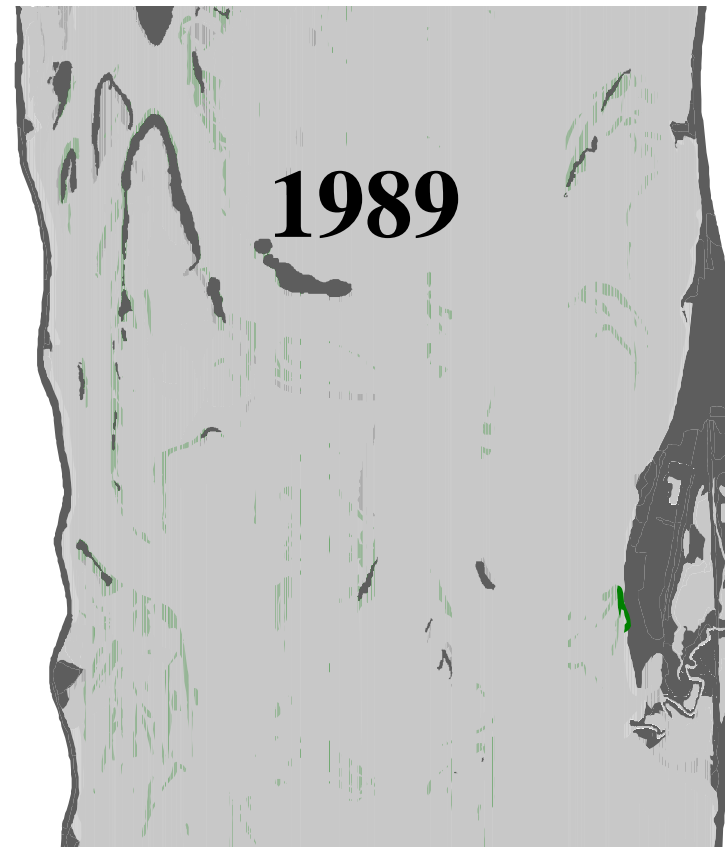
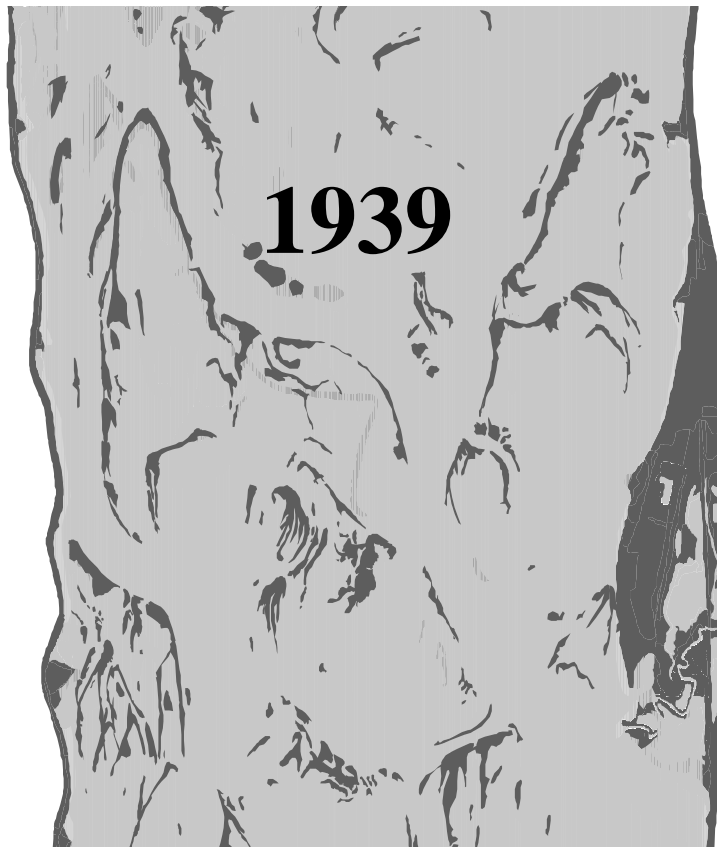
Pool 8 Islands, WI





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Island Erosion





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Geomorphic Response





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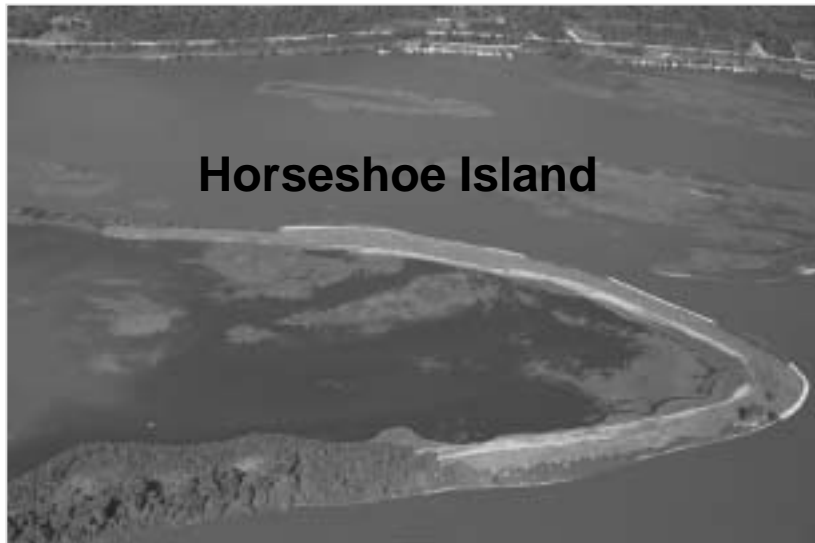
Island Design



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Pool 8 Islands

Phase I Stage 1

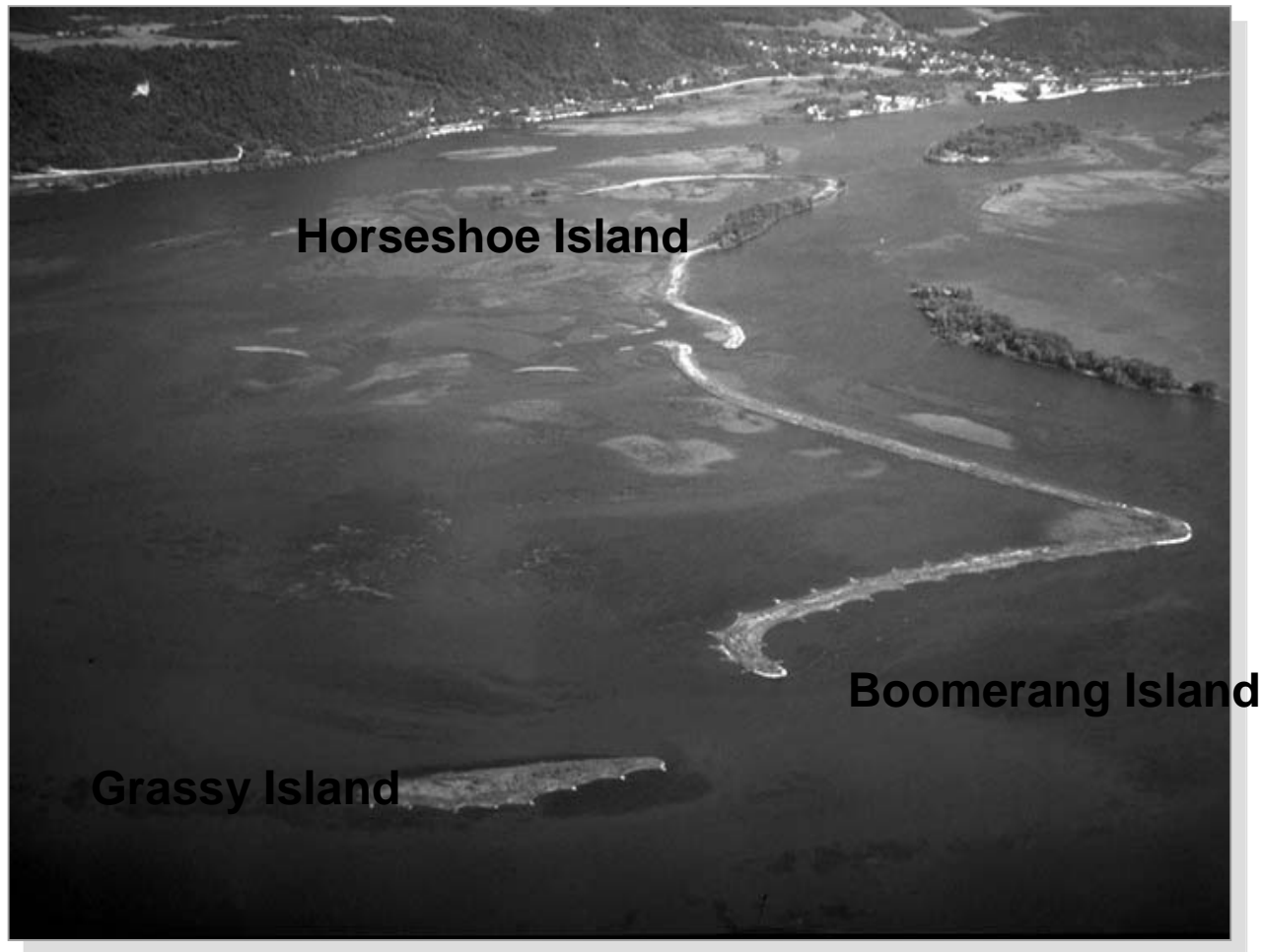


Horseshoe Island



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Pool 8 Islands Phase I





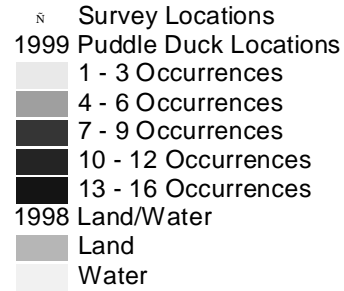
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Pool 8 Islands

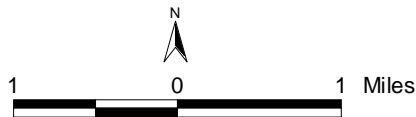
Phase II



1999 Lower Pool 8 Waterfowl Ground Surveys - Puddle Ducks



The survey was conducted 20 times during the fall season - twice weekly on randomly chosen days and times. The 1999 route had 11 stops on the west side of the pool from Lock and Dam 8 to Brownsville, Minnesota along Hwy. 26, and 2 stops along Hwy. 35 on the east side. Binoculars and a spotting scope were used to estimate the number of each species of waterbird seen at a specific stop. Numbers were recorded on a data table and the locations and shapes of the waterbird rafts were drawn on a map on the back of the datasheet. The waterbird numbers were entered into a digital database, and the raft locations were digitized and analyzed using ArcView.

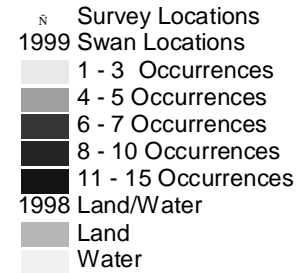


Upper Mississippi River
National Wildlife
and Fish Refuge

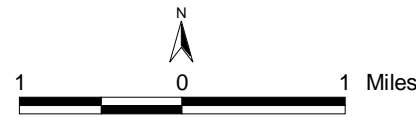
Questions regarding this study should be directed to Lara Hill,
Wildlife Biologist at the La Crosse District of the
Upper Miss. Refuge. Phone: (608) 783-8406. (2/29/2000)



1999 Lower Pool 8 Waterfowl Ground Surveys - Tundra Swans



The survey was conducted 20 times during the fall season - twice weekly on randomly chosen days and times. The 1999 route had 11 stops on the west side of the pool from Lock and Dam 8 to Brownsville, Minnesota along Hwy. 26, and 2 stops along Hwy. 35 on the east side. Binoculars and a spotting scope were used to estimate the number of each species of waterbird seen at a specific stop. Numbers were recorded on a data table and the locations and shapes of the waterbird rafts were drawn on a map on the back of the datasheet. The waterbird numbers were entered into a digital database, and the raft locations were digitized and analyzed using ArcView.



Upper Mississippi River
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Island Layout

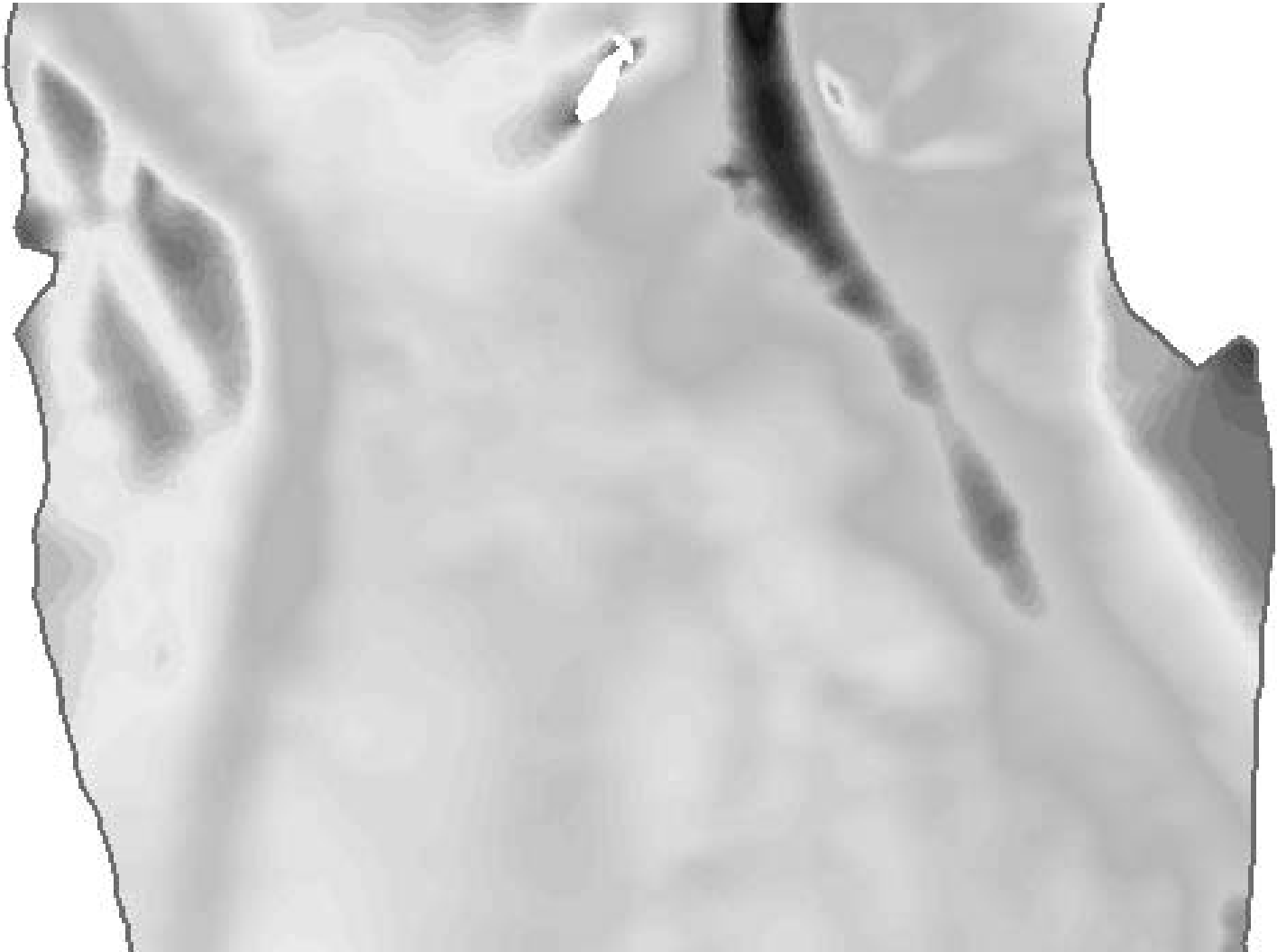
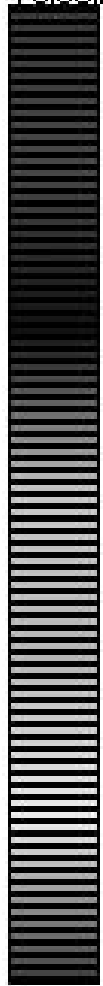
PAST	PRESENT
Reduce Sediment Load To Backwaters	Partially Restore Riverine Conditions. $Q_c \gg Q_f$ for Bankfull Conditions.
Reduce Wave Action	Wind Fetch $< 4000'$ in Shallow Areas ($< 4'$ deep)
Waterfowl & Fish Habitat	Fish: $v < .01$ fps, $d > 4'$ Ducks: Create Visual Barriers & Mudflats ...



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Pool 8, Phase 3 Existing Conditions Velocity

Velocity (ft/s)

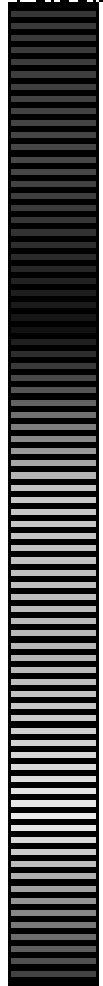




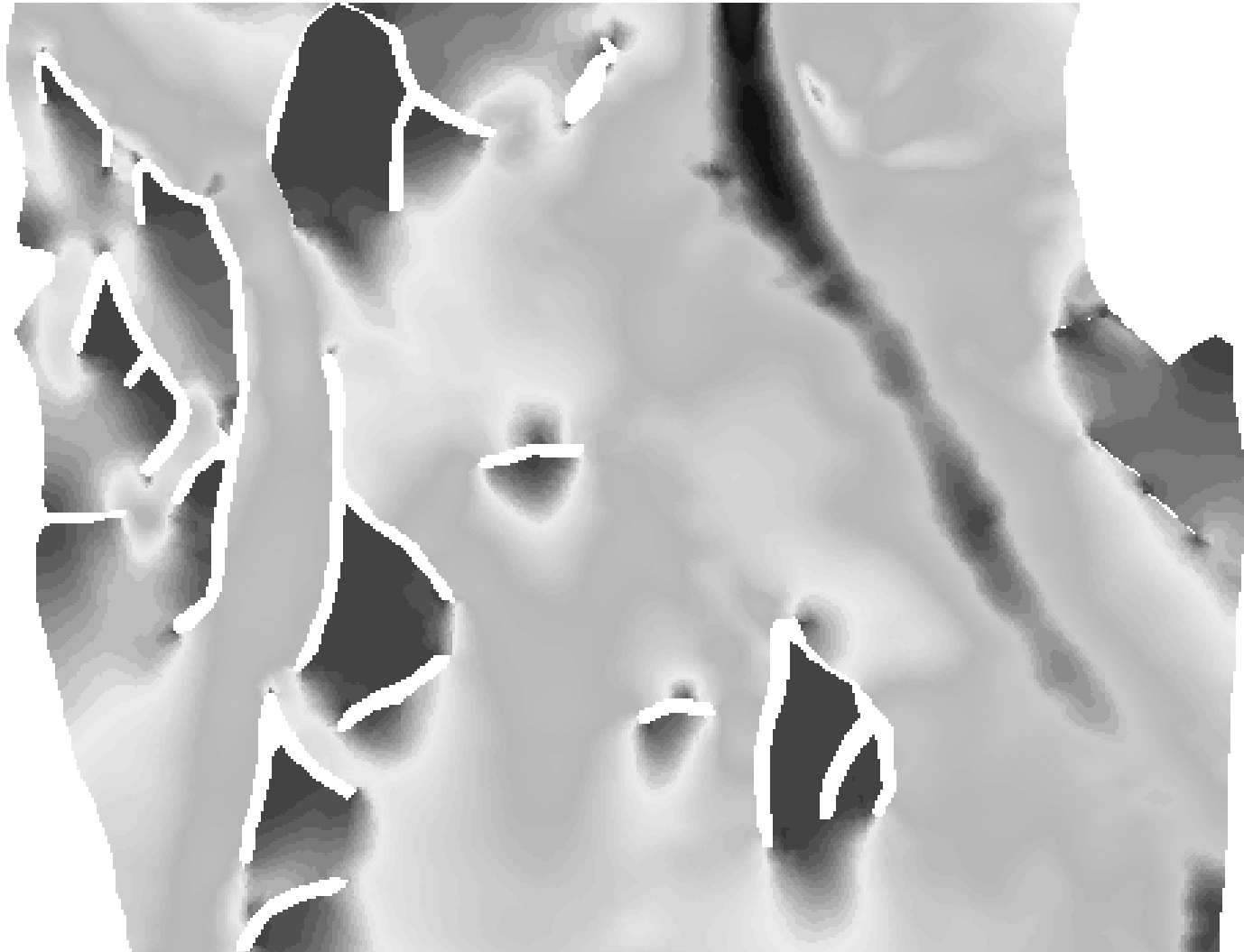
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Pool 8, Phase 3 Proposed Conditions Velocity

Velocity (ft/s)



4.00
3.80
3.60
3.40
3.20
3.00
2.80
2.60
2.40
2.20
2.00
1.80
1.60
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00





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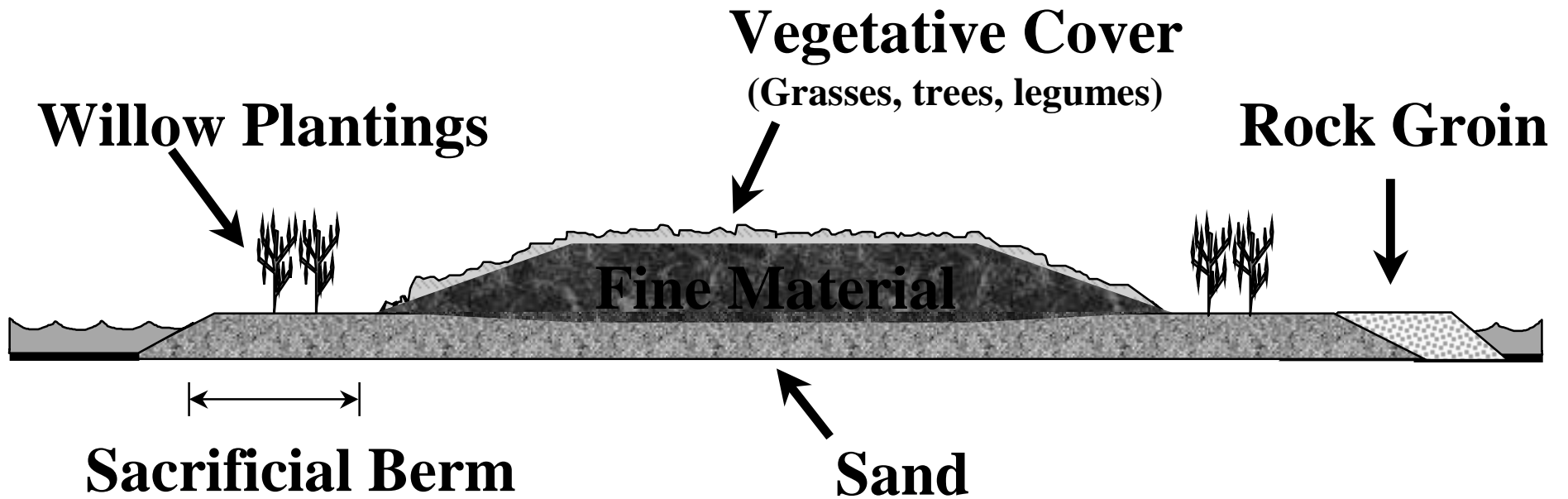
Pool 8, Phase 3 Layout





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Island Cross Section





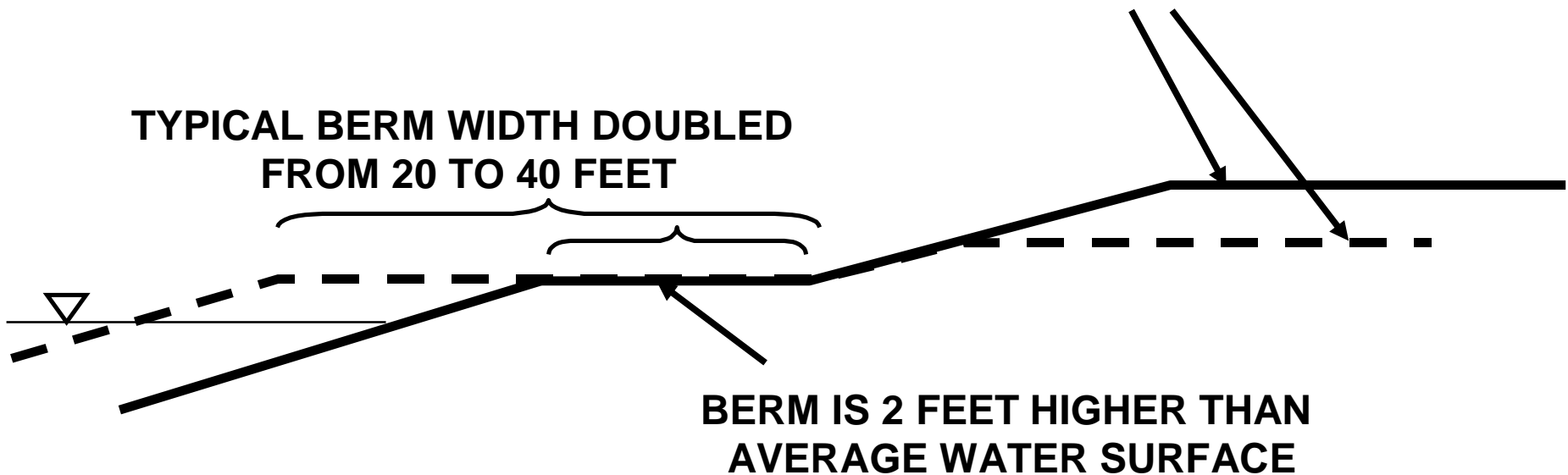
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Island Cross-Section Changes

TYPICAL ISLAND ELVATION DECREASED
FROM 10-YEAR FLOOD TO 3-YEAR FLOOD

TYPICAL BERM WIDTH DOUBLED
FROM 20 TO 40 FEET

BERM IS 2 FEET HIGHER THAN
AVERAGE WATER SURFACE



———— LAKE ONALASKA, 1989

- - - - POOL 8 PHASE III, 2001



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Topsoil

PAST	PRESENT
Percentage of fines > 40	Percent Fines Between 40 and 70. Sand is Required to Provide Optimum Substrate for Plants.
Vegetation Stabilizes Earth Structure During Floods	Vegetation and Topsoil With Cohesive Properties Stabilizes Earth Structure During Floods



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Polander Lake, 2001





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Pool 8, Phase II, 2001





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Shoreline Stabilization



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Type of Stabilization

PAST	PRESENT
RIPRAP	BIOTECHNICAL = INERT MATERIAL LIKE ROCK AND LOGS COMBINED WITH VEGETATION



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Riprap





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Biotechnical: Rock Groins





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Biotechnical: Off-Shore Rock Mound





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And Then Someone Said “This is too Stable”





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“We Would Like Mudflats, Sandbars, and Beaches”

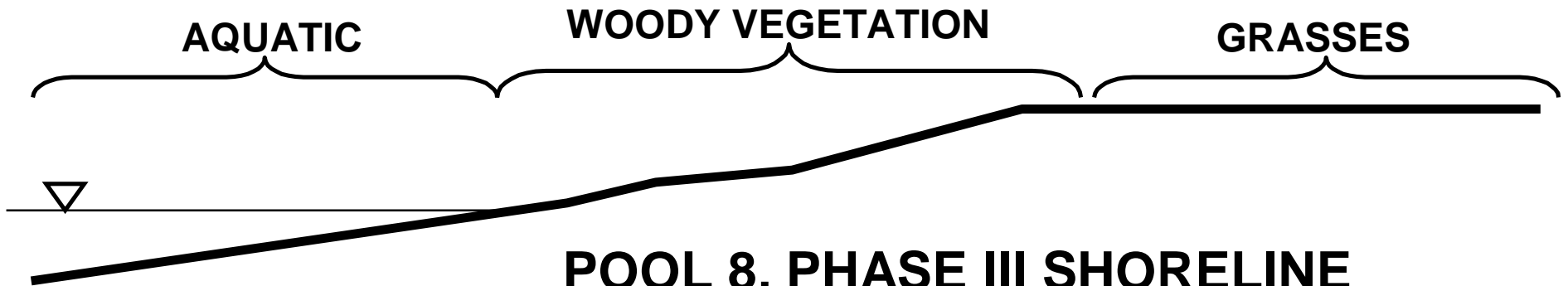




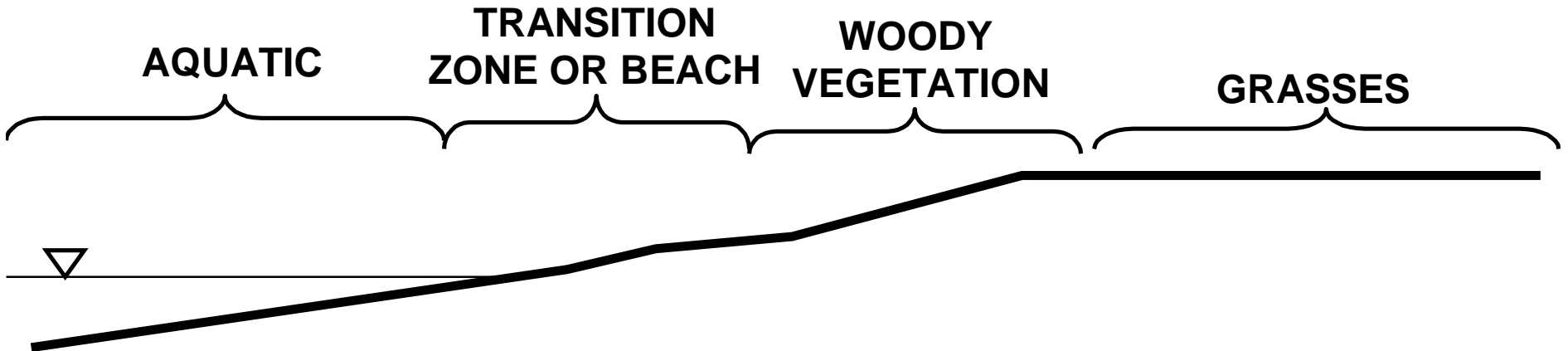
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Shorelines

POOL 8, PHASE II SHORELINE



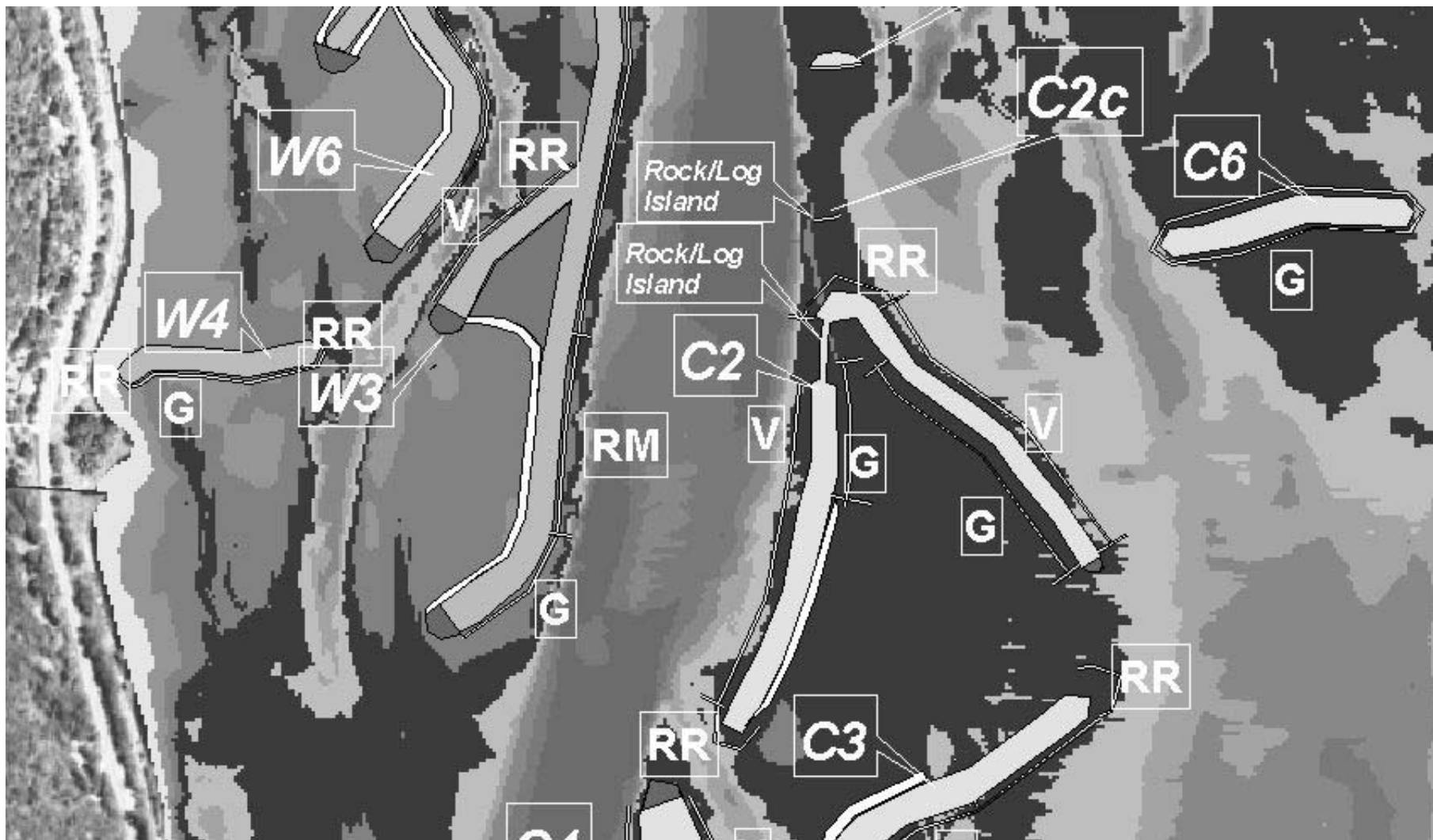
POOL 8, PHASE III SHORELINE





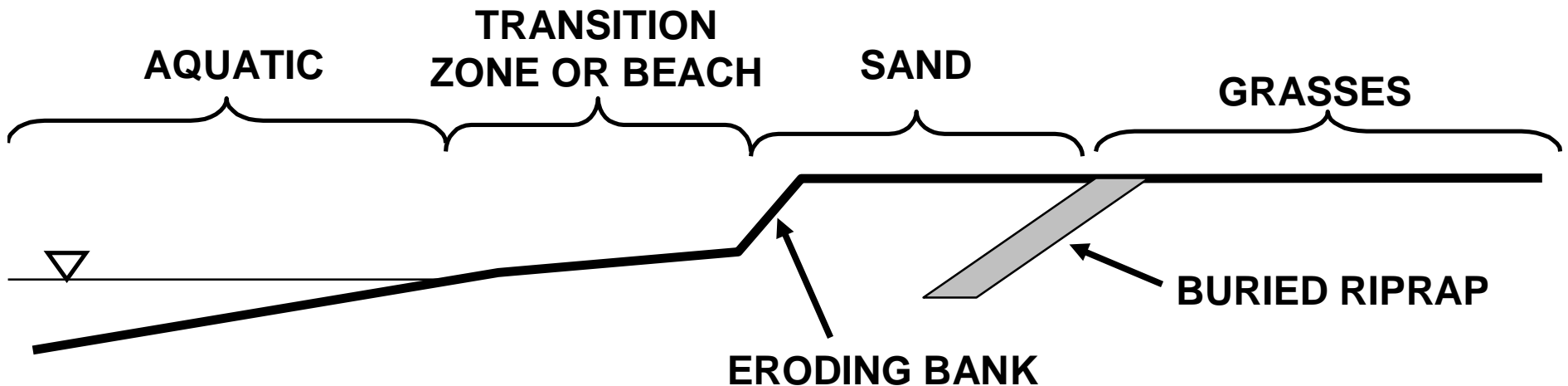
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Designing for Controlled Erosion and Stable Water Levels





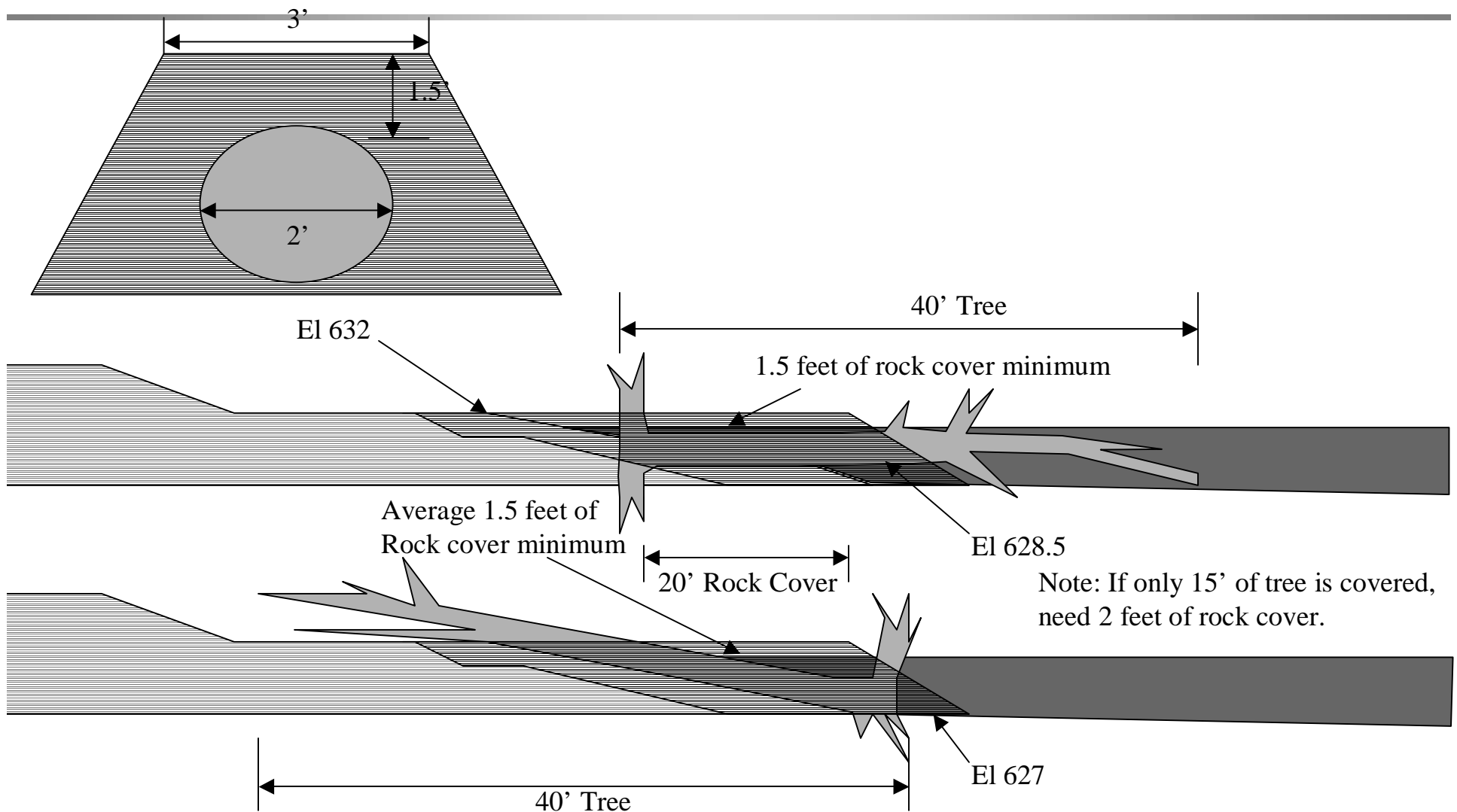
POOL 8, PHASE III MUDFLATS IN SHELTERED AREA





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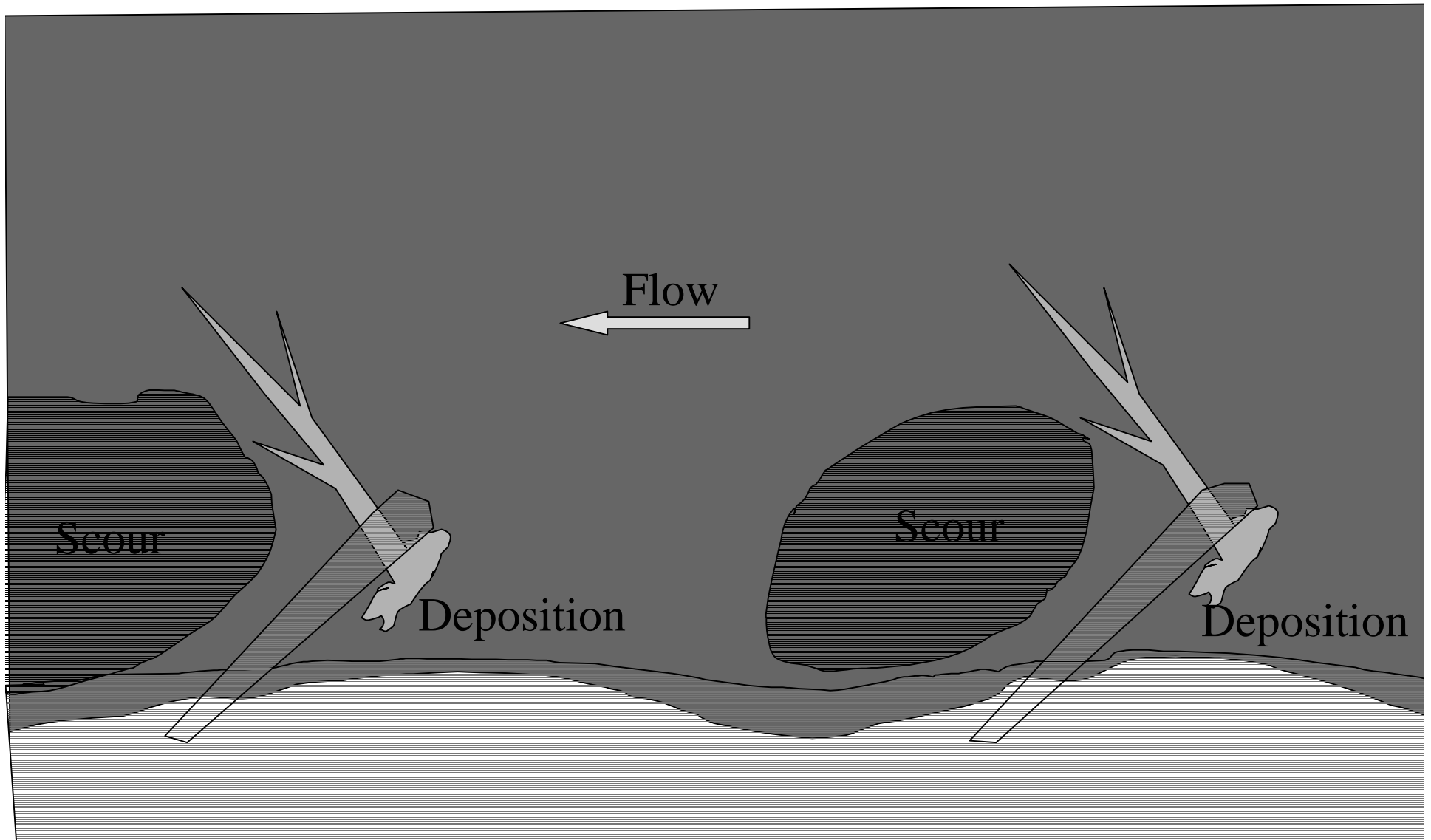
Pool 8, Phase III, Groins, 2004





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Pool 8 Phase III, 2004





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Conclusion

- **Habitat Project Engineering Must Evolve as River Science (Hydrology, Geomorphology, Biology) Evolve.**
- **Lessons Learned Need to be Incorporated into Future Designs.**
- **The Large River Habitat Project Engineering Manual: Where is it?**



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Acknowledgements

USACE – St. Paul District

Jon Hendrickson, Hydraulic Engineer

Don Powell, Project Manager

Aaron Buesing, Hydraulic Engineer



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The End

